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SALT LAKE AREA OFFICE
8180 SOUTH 700 EAST, SUITE 200
SANDY, UTAH 84070-0562
801.566.6633
801.566.0750 FAX
PATLAW@TNW.COM
WWW.TNW.COM

U.S. MAILING ADDRESS
P.O. Box 1219
SANDY, UTAH 84091-1219

LAS VEGAS AREA OFFICE
OF COUNSEL: NEIL J. BELLER †
7408 WEST SAHARA
LAS VEGAS, NEVADA 89117
702.368.7767
† ADMITTED IN NEVADA

VAUGHN W. NORTH
M. WAYNE WESTERN
GARRON M. HOBSON
PETER M. DE JONGE
CLIFTON W. THOMPSON
STEVE M. PERRY
WEILI CHENG, PH.D.
DAVID R. MCKINNEY, PE.
GARY P. OAKESON
DAVID W. OSBORNE
DAVID L. STOTT
JASON R. JONES
PAUL C. OESTREICH, M.S.
ERIK S. ERICKSEN, M.S.
REGISTERED PATENT ATTORNEYS
NATHAN S. WINESETT
OF COUNSEL
BRYAN K. HANKS
PATENT AGENT
ALEX HAYMOND, B.S.: EE
TODD B. ALDER, PH.D.
JONATHAN M. BENNS, PH.D.
AARON M. SMITH, B.S.: EE
WILLIAM T. RALSTON, PH.D.: EE
TECHNICAL CONSULTANTS
CALVIN E. THORPE
(1938-1999)

October 3, 2003

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

TRANSMITTAL OF INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Re: U.S. Patent Application No. 10/615,569 filed 07-07-03
Applicant: Johnson et al.
Title: **APPARATUS AND METHOD FOR IMAGING OBJECTS WITH
WAVEFIELDS**
Group Art Unit:
Attorney Docket No. 22027.CIP3.CON2

Sir/Madam:

Transmitted herewith for filing and pursuant to 37 C.F.R. §§ 1.56 and 1.97 is an
Information Disclosure Statement.

Enclosed also are the following designated documents, as required under 37 C.F.R. §§
1.97 and 1.98:

- ☒ Form PTO-1449 list of 22 references submitted for consideration.
- ☐ Legible copies of the listed references or their relevant portions.
- ☐ All English translations of each non-English reference, if any, within the
possession, custody, control or availability of anyone designated in 37 C.F.R. §
1.56(c) (see 37 C.F.R. § 1.98(c)).

The following are included within the Information Disclosure Statement if applicable and as required under 37 C.F.R. § 1.98:

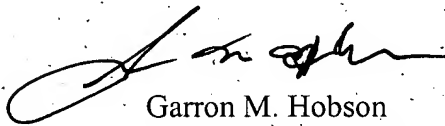
- ☐ Concise explanation of relevance of each reference not in English and unaccompanied by an English translation.
- ☐ Statement that certain listed references not enclosed are substantially cumulative of an enclosed reference.
- ☒ Statement that certain listed references not enclosed were previously cited by or submitted to the Office in the identified prior application which is relied upon for an earlier filing date under 35 U.S.C. § 120.

In order to secure consideration of the items designated above, one or more of the following, if required, is also enclosed:

- ☐ Statement under 37 C.F.R. § 1.97(e)(1) or (2).
- ☐ Check No. _____ in the amount of \$ _____ (amount in § 1.17(p)) constituting the submission fee set forth in 37 C.F.R. § 1.17(p).

In the event that 37 C.F.R. § 1.97(c) applies and the Examiner is not satisfied that the Statement meets the requirements of 37 C.F.R. § 1.97(e), or in any other event remediable by a fee, please credit any over payment or charge any additional fees to Deposit Account No. 20-0100 of the undersigned.

Respectfully submitted,



Garron M. Hobson
Attorney for Applicant
Registration No. 41,073

THORPE NORTH & WESTERN, LLP
Customer No. 20,551
P.O. Box 1219
Sandy, Utah 84091-1219
Telephone: (801) 566-6633

GMH/skp

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IN THE UNITED STATES PATENT & TRADEMARKS OFFICE

ART UNIT:

EXAMINER:

APPLICANT: Johnson et al.

SERIAL NO.: 10/615,569

FILED: 7/7/2003

CONFRM. NO.:

FOR: APPARATUS AND METHOD FOR IMAGING
OBJECTS WITH WAVEFIELDS

CERTIFICATE OF MAILING
UNDER 37 C.F.R. § 1.8

DATE OF DEPOSIT: Oct 3, 2003

I hereby certify that this paper or fee (along with any paper or fee referred to as being attached or enclosed) is being deposited with the United States Postal Service as first class mail with sufficient postage on the date indicated above and is addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.


Garron Hobson

INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. § 1.97

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir/Madam:

Please find, pursuant to 37 C.F.R. § 1.98(a)(1), the enclosed Form PTO-1449 which contains a list of all patents, publications, or other items that have come to the attention of one or more of the individuals designated in 37 C.F.R. § 1.56(c). Applicant respectfully submits that this Information Disclosure Statement is filed pursuant to:

☒ 37 C.F.R. § 1.97 (b)(1) or (3), within three months of the filing date of the application, or before a first office action on the merits, whichever occurs last;

☐ 37 C.F.R. § 1.97 (c), after a first office action on the merits, but before a Final Office Action or a Notice of Allowance, whichever occurs first, and is accompanied by either 1) a statement in accordance with 37 C.F.R. § 1.97(e), or 2) the fee set forth in § 1.17(p); or

☐ 37 C.F.R. § 1.97 (d), after a Final Office Action or Notice of Allowance, whichever occurs first, but on or before payment of the issue fee, and is accompanied by both 1) a statement in accordance with 37 C.F.R. § 1.97(e), and 2) the fee set forth in § 1.17(p).

While no representation is made that any of these references may be "prior art" within the meaning of that term in accordance with 35 U.S.C. §§ 102 or 103, the enclosed list of references is disclosed so as to comply with the duty of disclosure set forth in 37 C.F.R. § 1.56.

Moreover, while no representation is made that a specific search of office files or patent office records has been conducted or that no better art exists, the undersigned attorney of record believes that the references listed, together with any other references which may have been previously submitted or listed, are the closest to the claimed invention (taken in its entirety) of which the undersigned is presently aware, and no art which is closer to the claimed invention (taken in its entirety) has been knowingly withheld.

In accordance with 37 C.F.R. §§ 1.97 and 1.98, a copy of each listed reference (or relevant portion thereof) which was not previously submitted to, or cited by, the Patent Office is also enclosed.

For all listed references that are not either in the English language, or accompanied by a translation into English, a concise explanation of relevance as required under 37 C.F.R. § 1.98(a)(3) is enclosed attached to each.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or to credit any overpayment to Deposit Account No. 20-0100.

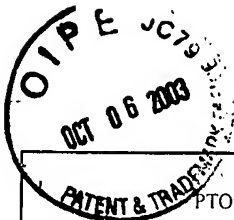
Dated this 3 day of October, 2003.

Respectfully submitted,



Garron M. Hobson
Attorney for Applicant
Registration No. 41,073

THORPE NORTH & WESTERN, LLP
Customer No. 20,551
P.O. Box 1219
Sandy, Utah 84091-1219
Telephone: (801) 566-6633



PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE LIST OF PRIOR ART CITED BY APPLICANT	ATTY. DOCKET NO. 22027.CIP3.CON2	SERIAL NO. 10/615,569
	APPLICANT Johnson et al.	
	FILING DATE 07-07-03	GROUP _____

U.S. PATENT DOCUMENTS

EXAMINER INITIALS		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	A1	4,662,222	05-05-87	Johnson, Steven A.			
	A2	5,588,032	12-24-96	Johnson et al.			
	A3	6,005,916	12-21-99	Johnson et al.			

FOREIGN PATENT DOCUMENTS

EXAMINER INITIALS		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO
	A4						

OTHER PRIOR ART (Including Author, Title, Pertinent Pages, Etc.)

	A5	P.R. Williamson, "Tomographic inversion in reflection seismology," Geophys. J. Int. 100, pp. 255-274, 1990
	A6	W.W. Kim, D.T. Borup, S.A. Johnson, M.J. Berggren, and Y. Ahou, "Accelerated Inverse Scattering Algorithms for Higher Contrast Objects," in 1987 IEEE Ultrasonics Symposium, 903-906, (IEEE Cat. No. 87ch2492-7)
	A7	S.J. Norton, "iterative Seismic Inversion," Geophysical Journal, No. 94, pp457-468 (1988)
	A8	T.K. Sarkar, E. Arkas, and S.M. Rao (1986) "Application of FFT and the Conjugate Gradient Method for the Solution of Electromagnetic Radiation from Electrically Large and Small Conducting Bodies," IEEE Trans. Antennas Propagat., vol. AP-34, pp. 635-640, May.
	A9	R.J. Wombel and M.A. Fiddy (1988), "Inverse Scattering Within the Distorted-wave Born Approximation," Inverse Problems 4 (1988).
	A10	Y. Zhou, S.A. Johnson, M.J. Berggren, B. Carruth, and W.W. Kim, "Constrained Reconstruction of Object Acoustic Parameters from Noisy Ultrasound Scattering Data," Proc. of the IEEE 1987 Ultrasonics Symposium pp. 897-901 (1987).
	A11	Kostas T. Ladas and A. J. Devaney, "Iterative Methods in Geophysical Diffraction Tomography," Inverse Problems 8 (1992).
	A12	M.J. Berggren, S.A. Johnson, W.W. Kim, D.T. Borup, R.S. Eidens and Y. Zhou, "Acoustic Inverse Scattering Images from Simulated Higher Contrast Objects and from Laboratory Test Objects," Acoustical Imaging 16, Chicago, Illinois, Jun. 1987.
	A13	Brent S. Robinson and James F. Greenleaf, "An Experimental Study of Diffraction Tomography Under the Born Approximation," Acoustical Imaging 18, No. 18, Jun. 1990.
	A14	M.J. Berggren, S.A. Johnson, B.L. Carruth, W.W. Kim, F. Stenger and P.L. Kuhn, "Performance of Fast Inverse Scattering Solutions for the Exact Helmholtz Equation Using Multiple Frequencies and Limited Views," Acoustical Imaging 15, Halifax, Nova Scotia, Jul. 1986.
	A15	W.W. Kim, S.A. Johnson, M.J. Berggren, F. Stenger and C.H. Wilcox, "Analysis of Inverse Scattering Solutions from Single Frequency, Combined Transmission and Reflection Data for the Helmholtz and Riccati Exact Wave Equations," Acoustical Imaging 15, pp. 359-369, Plenum Press (1987).

EXAMINER

DATE CONSIDERED

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication with applicant.



PTO-1449	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY. DOCKET NO. 22027.CIP3.CON2	SERIAL NO. 10/615,569
		APPLICANT Johnson et al.	
		FILING DATE 07-07-03	GROUP

LIST OF PRIOR ART CITED BY APPLICANT

OTHER PRIOR ART (Including Author, Title, Pertinent Pages, Etc.)

	A16	E.J. Ayme-Bellegarda and T.M. Habashy, "Forward Ultrasonic Scattering from Multidimensional Solid or Fluids Inclusions Buried in Multilayered Elastic Structures," IEEE Trans. Ultras., Ferro., and Freq. Cont., vol 39, No. 1, Jan. 1992.
	A17	E.J. Ayme-Bellegarda, and T.M. Habashy, "Ultrasonic Inverse Scattering of Multidimensional Objects Buried in Multilayered Elastic Background Structures," IEEE Trans. Ultras., Ferro, and Freq. Cont., vol 39, No. 1, Jan. 1992.
	A18	J.K. Cohen and F.G. Hagin, "Velocity Inversion Using a Stratified Reference," Geophysics, 50, 11, 1985.
	A19	E. Crase, A. Pica, M. Noble, J. McDonald, and A. Tarantola, "Robust Elastic Nonlinear Waveform Inversion: Application to Real Data," Geophysics, 55, 5 (May 1990).
	A20	Peter Mora, "Nonlinear Two-dimensional Elastic Inversion of Multioffset Seismic Data," Geophysics, vol. 52, 9, Sep. 1987.
	A21	G.S. Pan, R.A. Phinney and R.I. Odom, "Full-waveform Inversion of Plane-wave Seismograms in Stratified Acoustic Media: Theory and Feasibility," Geophysics, vol. 53, 1 (1988).
	A22	G.R. Franssens, "Calculation of the Elasto-dynamic Green's Function in Layered Media by Means of a Modified Propagator Matrix Method," Geophys. J.R. astr. Soc. 1983.
	A23	B.L.N. Kennett and N.J. Kerry, "Seismic Waves in a Stratified Half Space," Geophys. J.R. astr. Soc. 57, pp. 557-583, 1979.
	A24	
EXAMINER		DATE CONSIDERED

***EXAMINER:** Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication with applicant.